

Does the Order of Presentation of 0-10 Rating Scales Affect Responses? An Application to Telephone Surveys

¿Influye en la respuesta el orden de administración de escalas valorativas 0-10? Una aplicación en encuestas telefónicas

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Key words

Scale Direction

- Telephone Surveys
- Measurement Scales
- Response Order

Palabras clave

Dirección de la escala

- Encuestas telefónicas
- Escalas de medida
- Orden de respuesta

Abstract

Despite the long tradition of research on “response effects” in surveys, there is little literature on the impact of the direction of administration of ordinal rating scales. Recent studies have shown that varying the direction of an 11-point scale produces different distributions. This study seeks to analyse to what extent these conclusions, found among North American society, are also applicable to Spanish society. A telephone survey administered to two equivalent samples of an autonomous region provided very similar responses, regardless of the direction of ordinal rating scales.

Resumen

Pese a la gran tradición de las investigaciones sobre “efectos de respuesta” en encuestas, hay escasa literatura sobre la influencia de la dirección de administración de escalas ordinales. Investigaciones recientes han demostrado que variar la dirección de una escala de 11 puntos influye en las respuestas obtenidas/logra distribuciones diferentes. El presente trabajo busca analizar hasta que punto estas conclusiones, localizadas en la sociedad norteamericana, se producen también en la sociedad española. Una encuesta telefónica aplicada a dos muestras equivalentes de una comunidad autónoma proporciona una gran similitud en las respuestas con independencia de la dirección de administración de escalas ordinales. De las 14 escalas empleadas, tan solo 3 presentan distribuciones diferentes, influyendo más la edad y el nivel de estudios.

Citation

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INTRODUCTION

The study of “response effects” is a field with a long tradition in survey research. To a lesser or greater extent, this topic has received the attention of numerous researchers from the mid-1940s to the present day (among others, Kamoen *et al.*, 2011). The influence of the order in which the categories are displayed has been explained by considering numerous factors. One of the first interpretations referred to the different types of *memory*, as it held that *long-term* memory is used to retain the categories presented first, whereas the categories presented later are stored in *short-term* memory (among others, Bruce and Papay, 1970).

Other experts (Simon, 1957, among others) have alluded to the desire to complete the questionnaire as quickly as possible, which generates time pressure and makes it difficult to understand the question and choose appropriate answers (Tourangeau and Rasinski, 1988).

A third interpretation, developed by Krosnick and Alwin (1987), advocates that, even if respondent's have settled ideas on the issues in question, the speed at which information is selected means that the first questions create a cognitive framework that will be used to assess those appearing later.

Without neglecting the importance of these aspects, numerous studies have recently shown that the direction of rating scales greatly influences survey responses (among others, Bassili and Krosnick, 2000, Tourangeau, Couper and Conrad 2013; Yan and Keusch, 2015). These experts found a “scale direction effect”, that is, they identified variations in responses when a scale starting with the lowest values was used, as opposed to a scale that began with the highest values. This effect, found in other countries, is the basis for this study. The aim is to demonstrate to what extent these findings, initially identified in a survey on economic issues (Yan and Keusch, 2015) and later confirmed

in surveys on political topics (Liu and Keusch, 2017; Yan, Keusch and He, 2018), are reflected in Spain.

The study begins with a brief discussion of the most significant studies on the effect of response categories, and on the effects produced by scale direction. The second section contains a description of the survey used to check the presence of this effect in Spain, specifying the questions and data analysis techniques employed. The third section analyses the effects of each type of question, and is followed by the conclusions.

THE INFLUENCE OF THE ORDER OF QUESTIONNAIRE RESPONSE CATEGORIES

Out of all the possible effects produced by the order of presentation of responses, this study will focus on rating scales. This type of scales are very commonly used in social and political investigations, and they have been used in surveys in countless areas which have included assessment of politicians and leaders, satisfaction with products or services, probability of political participation, left-right ideology, etc.

Once the use of this type of question has been decided, the researcher must subsequently decide on the number of response categories, the existence/absence of an intermediate option, the use of items at the end of the scale or for each of the categories, the use of an agree-disagree format and of a specific scale, and the order of presentation of response choices (Krosnick and Presser, 2010). The researcher will use each of these elements according to the needs of the analysis, since the decisions taken at this time will determine the data analysis techniques used.

Each of these decisions will affect the degree of effort required on the part of the respondent. For example, the agree-disagree format with 11 categories (0 to 10) with labels only at the ends is very commonly used, but

has been discouraged by numerous experts (among others, Dillman, Smyth and Christian, 2014; Revilla, Saris and Krosnick, 2014) due to the greater cognitive effort that the respondent must make to process information of this type, as proven in numerous studies (among others, Krosnick and Presser, 2010). In addition, many people have difficulty in expressing themselves in numerical terms, which implies a double process: formulating an opinion and subsequently “converting” it into a numerical value.

Some experiments (among others, Tourangeau, Couper and Conrad 2013) have found that numerical scales with labels at both ends are answered more quickly when they start with the most positive-favourable responses (10, in this case); although they have also warned that this form of display causes the first options on the scale to be chosen more often. More recent studies (Dillman, Smyth and Christian, 2014) have not detected any differences in distribution when scales start with the most positive-favourable or the most negative-unfavourable value, confirming that responses are provided more quickly when scales begin with positive-favourable values.

Given the disparity of results (between these and other studies), in 2013 and 2014 the Association for Public Opinion Research -AAPOR held two meetings on the subject, which concluded that the same scale size and equal numerical and/or verbal labels do not guarantee validity, as the direction of the scale influences the perception of, and the answers provided by respondents. In light of these findings, and considering the differences between the application of the scales in North America (from “totally agree” to “strongly disagree”) and in the Netherlands (inversely), Yan and Keush (2015) used a scale for rating country development that was applied in both directions: one from ten to zero (from more to less developed countries) (10-0), and another one from zero to ten (from less to more developed countries) (0-10).

The results obtained showed that higher scores were provided for all countries (higher development) when the scale started with the highest number, concluding that “[...] ratings are more variable for developed countries when the scale starts with 0 and for undeveloped countries when the scale begins with 10” (Yan and Keush, 2015).

Seeking to generalise their findings to other subject areas, a similar study was carried out on two surveys on political issues (Liu and Keusch, 2017; Yan, Keusch and He, 2018). The results showed that the direction of the scale had a greater effect on non-attitudinal questions when they were placed in the second half of the questionnaire; and when the scale was long (Yan, Keusch and He, 2018).

While initial studies have indicated that educational level has little influence on response effects (among others, Schuman and Presser, 1981), later research using the meta-analysis technique has shown that educational level and age greatly influence the effect of order of questionnaire response options (Krosnick, Narayan and Smith, 1996). Educational level is related to the use of cognitive skills. After the age of 65 there is a loss of cognitive abilities, mainly a decrease in memory.

METHODOLOGICAL DESIGN: APPLICATION OF INTERNATIONAL FINDINGS TO A SURVEY CONDUCTED IN AN AUTONOMOUS REGION IN SPAIN

Following the rationale of the first experiment by Yan and Keusch (2015), a telephone survey of households with landlines was used. Using the census as a sampling frame, two equivalent samples of 448 people who were stratified according to the area of residence and type of living environment were selected. The municipalities and the respondents were selected randomly, with quotas of sex and age additionally used for selecting respond-

ents. Some 30 repeated call-backs to non-contacted households, and the use of strategies for conversion of “soft” refusals provided a response rate (TR4) of 64%, very similar to the initial study carried out by Yan and Keusch (2015). The importance of the institution conducting the study, and the brevity of the questionnaire contributed to explaining the high cooperation levels.

The decision to choose a sample of landlines was based on the attempt to replicate Yan & Keusch’s study as much as possible. Whereas a sample of landlines clearly poses some representativeness problems, (the Spanish Statistics Institute (2017) estimated that 17.4% of the Navarrese population do not have landlines), the objective of the study was not so much to generalise the results to a given population, but the analysis of the differences between experimental treatments.

It is important to mention two factors specific to telephone surveys here, namely stating a preference for the more extreme responses (Ye *et al.*, 2011), and the problems that may arise from the use of channel medium of oral communication, in terms of respondents being able to adequately process the first response alternatives. Providing other options means that the first one is processed at a higher speed, thus increasing the number of choices of the last category (Gwartney, 2007; Díaz-de-Rada, 2010).

The questionnaire had two versions (named A and B), which only differed in the order of presentation of the response options, and were administered to two equivalent samples. The samples were similar with regard to sex, age, level of education, relationship with the activity, household size and living arrangement (Cramer’s V values of less than 0.08, with levels of significance considerably higher than 0.10). As it was a questionnaire about political attitudes, it also tested the ideology of respondents, their intention to vote, sympathy towards parties, and vot-

ing recall in the last regional election (Cramer V values of 0.096, 0.138, 0.211 and 0.108; levels of significant of 0.759, 0.145, 0.086 and 0.580, respectively).

The fieldwork was carried out by 10 interviewers in September 2017. They had no knowledge of the object of the study and, in order to eliminate their possible influence, they did each questionnaire alternately, so that they all administered the same number of A and B questionnaires. In order to eliminate time bias, each interviewer had to carry out questionnaire A and immediately after questionnaire B, and the session would only end when both had been conducted.¹

Regarding the subject of the study, questions that were “usual” in political research were used: the “typical” rating scale (0-10) of political leaders; self-definition of the respondents regarding political ideology; scale to evaluate four important institutions in the Navarre region; assessment of the regional government and president (see Table 1). These were distributed throughout the questionnaire to avoid biased answers (Alvira, 2011). These are common questions in the “political barometers” used by the Centre for Sociological Research (hereinafter CIS), and have also been frequently used in telephone surveys (among others, CIS, 2017). A recommendation made by Alvira was followed: “when evaluating, political leaders, for example a rating scale between 0 and 10 can be used as an aid ...” (Alvira, 2011: 36). In the “A” questionnaire, the scale ran from 0 to 10, 0 being the “worst rating” and 10 the “best rating” (see Table 1). This was reversed in questionnaire B, which ran from 10 to 0, as used by Schuman and Presser (1981) in their classic study on acquiescence in agree-disagree questions.

¹ In other words, the session could not finish after conducting questionnaire A, leaving questionnaire B for the next day. Both had to be carried out in the same work session.

FIGURE 1. - *Questions used*

Rating of parliamentary speakers (on a scale from 0 to 10)

How do you rate the political performance of ____ [NAME OF EACH PARLIAMENTARY SPEAKER], using a scale ...

- A. ... from 0 to 10, where 0 means “very poor” and 10 “very good”?
- B. ... from 10 to 0, where 10 means “very good” and 0 “very poor”?

Respondent's ideological self-identification

The terms left and right are often used to talk about politics. Where would you place yourself on a scale ...

- A. ... from 0 to 10, where 0 means extreme left and 10 extreme right?
- B. ... from 0 to 10, where 10 means extreme right and 0 extreme left?

Rating of four important institutions in Navarre

How do you rate the performance of the Parliament of Navarre on a scale ...

- A. ... from 0 to 10, where 0 means “very poor” and 10 means “very good”
- B. ... from 10 to 0, where 10 means “very good” and 0 means “very poor”

Same scale is applicable for the Ombudsman of Navarre, the Regional Audit Chamber, and the Government of Navarre's Representative.

Rating of the regional government's and the regional president's management

How would you rate the performance of the President of the Government of Navarre, Uxue Barkos, on a scale ...

- A. ... from 0 to 10, where 0 means that “very poor” and 10 that “very good”?
- B. ... from 10 to 0, where 10 means that “very good” and 0 “very poor”?

Same scale is applicable for the regional government.

Source: Developed by the author.

It is important to note that numerous studies have found respondents pay more attention to the number (of the scale) than to the text placed at both ends (among others, Sudman, Bradburn and Schwarz, 1996; Schwarz *et al.*, 1991). This influence is greater in telephone surveys, due to the greater difficulty in remembering all the options.

Based on previous studies on the subject (among others, Tourangeau; Couper and Conrad 2013), a hypothesis was proposed, namely that higher average ratings would be obtained on a 10 to 0 scale, as a result of the primacy effect, among other reasons. The second hypothesis held that the narrower the scope of the question, the less likely it would be for these findings to be obtained on scales from 0 to 10. The third hypothesis, based on studies by Dillman, Smyth and Christian (2014), postulated that there is a shorter response time when rating scales start with positive response options.

The mean difference test was used to find the effect produced by the different forms of administration, as similar studies have done in other contexts (among others, Chang and Krosnick 2010).

At the end of the first section it was noted that educational level and age have been found to have a strong effect on response effects. These variables were codified into three and four categories in the present study: basic, secondary and higher education; and aged 16-29, 30-49, 50-64 and more than 65. In multi-category variables it is not possible to use the mean difference test, so a one-way ANOVA test was performed, and the Brown-Forsythe test was used to test for distributions with unequal variance. In order to detect the possible joint influence of the type of questionnaire, sex and education level, a two-way ANOVA test was employed.

RESULTS

The results are structured following the rationale described in Figure 1, namely three sections where there is an analysis of the scale used to rate politicians and the respondent's ideological self-identification; in the second one, there is the assessment of several relevant institutions in the Navarre region; and in the third one, the performance rating of the regional government and president.

Rating of parliamentary speakers and respondent's ideological self-identification on a scale from 1 to 10

Parliamentary speakers were, for the most part, the leaders of the political parties that participated in the last regional election. This was true in all cases except for the governing party, whose spokesperson was proposed to run as a member of the Spanish parliament in the general election of December 2015. It should also be noted that the spokesperson for *Podemos* had the least time in the role, as he had been in office since 3 July 2017.

Before requesting that respondents provided a rating for each leader, they were asked to identify each one with the political party to which they belonged. The results are shown in the second column of Table 1.² The spokespersons for the *PSOE* and *UPN* were the most recognised, and the spokesperson for *Podemos* was the least recognised (clearly for the reason mentioned above). It was surprising that the spokesperson for Geroa Bai was widely recognised, as he did not run for the regional election, although this could be explained by his participation in the general election. The respondents who correctly identified the candidates with the relevant

² The first column shows the number of respondents who refused to answer the question in each sample. There were 14-16 respondents in each sample, representing only 3.8% of the total, a small size which did not affect the study's results. A detailed analysis of this group reveals that 30 did not rate any of the politicians.

TABLE 1. Rating of parliamentary speakers and ideological self-position (on an 11-point scale)

	No response	Level of recognition	Nº of cases	Total average	Average 0-10	Order 10-0	Difference
EH-Bildu	16/14	33.6%	257	4.3	4.4	4.2	0.21
PP	17/14	36.6%	271	3.5	3.4	3.6	-0.28
PSOE	17/14	53.0%	395	4.7	4.6	4.8	-0.18
UPN	16/14	51.3%	388	3.9	3.6	4.2	-0.54*
Geroa Bai	15/14	34.1%	260	5.2	5.3	5.0	0.27
Izquierda Esquerra-IE	16/15	13.0%	100	4.6	4.6	4.6	-0.03
Podemos	16/15	10.0%	67	4.5	4.7	4.3	0.32
Ideology	29/26		792	4.5	4.5	4.5	0

* <0.05.

Note: The leaders are shown in the order they were asked about.

Source: Developed by the author.

party were later asked about their assessment of each leader. This involved a reduction in the sample size, notable in the case of the spokespeople for *IE* and *Podemos*. The low sample size of the latter (38 cases in sample A and 29 in sample B), means that it should be treated with extreme caution.

When using the presentation of scales from 1 to 10 (the most commonly used in surveys), the *Geroa Bai*'s spokesperson was the most highly rated, followed by the spokespersons for *Podemos* and *PSOE-UE*. The presentation of scales from 10 to 0 showed lower ratings for the spokespersons of three of the four parties that governed in Navarre when the study was carried out, namely *Geroa Bai*, *EH-Bildu* and *Podemos*. Only the rating provided for *IE* did not change. These are small differences, except in the case of the *UPN* spokesperson (almost half a point, the only significant difference). The comparison between the two scale directions showed that the rating of the spokespeople varied. The spokespeople for the *PSOE* and *IE* obtained the second and third best rating.

Once the absence of a scale direction effect was verified, the rest of the variables capable of being influenced were analysed.

Education level presented a significant difference in the case of the spokespersons for the *PSOE* ($F 10.5, p 0.000$) and the *UPN* ($F 5.9, p .003$), and a less significant difference for the *PP* ($F 3.79, p 0.049$). The three spokespersons achieved high ratings from the respondents with a low educational level (5.5, 4.7 and 4.4, respectively), a score that fell among respondents with a high educational level (4.3, 3.5 and 3.2, respectively). The same leaders also had different ratings when the age of the respondents was taken into account, which showed that as the age increased, the rating of each leader decreased. This happened up to 64 years old, whereas the trend changed among the oldest respondents, who assigned the highest scores. As it was suspected that the variability within each subsample could be causing the differences between samples, each one was analysed separately, and the same trend was found. However, there was no significant difference when all three variables were considered together (questionnaire order, age and education).

The lower part of the table shows that there was no difference in terms of ideology, as identical averages were found in both samples.

TABLE 2. *Rating of the performance carried out by four Navarran institutions*

	No response	Level of recognition	Nº of cases	Total average	Average 0-10	Order 10-0	Difference
Parliament	7/6	41.9	345	5.2	5.3	5.2	0.05
Ombudsman	2/2	40.7	322	5.6	5.4	5.7	-0.25
Audit Chamber	3/2	38.8	291	6.1	6.2	6.0	0.21
Government Representative	2/2	35.2	291	4.3	4.0	4.6	-0.57*

* <0.05

Source: Developed by the author.

Rating of the performance of four important regional institutions

As indicated in Table 1, the second aspect, to be rated was the performance of the regional Parliament of Navarre (*Parlamento de Navarra*), the regional Ombudsman (*Defensor del Pueblo autonómico*), the regional Audit Chamber (*Cámara de Comptos*) and the regional Government's Representative (*Delegado del Gobierno*). The questions were administered exactly as in the previous case; a total of 4-5 respondents failed to answer, and a total of 13 provided no response to the question about the Parliament.

The average level of knowledge about the Parliament and the Ombudsman was slightly in excess of 40%, whereas it was somewhat lower for the regional Audit Chamber and the regional Government's Representative (Table 2). Ratings were only provided by those who knew each institution. The Government's Representative received the poorest ratings. However, the ratings of this position also showed the greatest differences, half a point between one scale and another. Better ratings were obtained on the scale from 10 to 0, as proposed in the hypothesis. The differences were lower in the case of the Ombudsman and the Audit Chamber, with differences slightly higher than 0.20 points, which was not significant. It was surprising that the Audit Chamber obtained an average score that was higher when using the scale from 0 to 10 than the opposite scale.

The study of the differences by level of education and age only provided significant differences by age in the cases of the Audit Chamber and the Government's Representative. The rating of the Audit Chamber improved as the age of the respondents increased, whereas for the Government's Representative, the highest scores were obtained from the extreme groups: those under 30 and those over 65. There was no difference in the joint analysis of education level, age and direction of response.

Rating of the performance of regional government and president

Data were collected from almost the entire sample regarding the third aspect considered,³ as the regional government and president were sufficiently recognised by most of the interviewees. The difference was the lowest of all those considered (see Table 3). Only age showed a significant relationship in both questions, where older people provided higher ratings.

Other possible influential factors

Little variability was seen in the direction of 0-10 scales. The results were different to

³ With the exception of 16 and 23 interviewees who did not answer both questions, 9 and 13 respectively in sample A; 7 and 10 in sample B.

TABLE 3. *Rating of the Regional Government's and president's performance*

	No response	Nº of cases	Total average	Average 0-10	Order 10-0	Difference
Government performance	9/7	824	4.8	4.9	4.8	0.07
President performance	13/10	801	4.9	4.9	4.8	0.09

Source: Developed by the author.

those obtained by Keusch, which leads to the need to verify to what extent those numerical scales with labels at the ends are answered more quickly when they start with the most positive response options. These results were also shown by Dillman's team (Dillman, Smyth and Christian, 2014).

It should be taken into account that the scales used in the previous sections included only 14 of the 80 variables included in the questionnaire. Therefore, it was decided to compare the ordinal questions from the type-A questionnaire (which began with positive/favourable response options: "very good", "highly favourable", etc.) with those of questionnaire B, in which questions began with negative/unfavourable response options: "very poor", "highly unfavourable", etc. According to the approaches included in the previous paragraph, questionnaire A should have a shorter duration than questionnaire B. The second hypothesis, which postulated that differences decrease when the scope of the question is narrower, needed to consider these questions separately, most of them using scales of 4-5 categories.

Questionnaire A was answered in an average of 11.9 minutes, and B required 12.01. This is a non-significant difference, which confirmed that the direction of the responses had no effect.

CONCLUSIONS

There was hardly any difference in the scales from 0 to 10, regardless of whether they were used in one direction or another. Only two items, out of the 14 used, presented differ-

ences related to the direction of the scales. The effect of age and educational level were found to be greater. The effects of these variables may have concealed other factors, such as the *recency effect* (characteristic of telephone surveys), the different levels of political culture, and the *strength* of the political attitudes held (Bassili and Krosnick, 2000). The first interpretation involves a greater choice of the last response categories among the respondents with low educational levels, which was not seen when each subsample was analysed separately. Nor was an influence of a greater or lower political cultural level seen. The verification of the third interpretative avenue requires an analysis of respondents' interest in politics, as the most interested respondents should present greater differences in their political ratings, something that was not found. The influence of educational level and age was lower in each subsample than when both were compared, although the differences were not significant.

The differences were smaller for the rest of the questions (ordinal questions containing 4 and 5 categories). Finally, regarding the time of administration, the duration was similar for both questionnaires.

At this point the reader may feel discouraged about the results. Especially when considering the large number of studies that pointed in a different direction, as discussed in the first part of the paper. However, I feel the opposite. The stability of the findings confirmed the suitability of the survey tool for the intended context, and "validates" those research findings that used scales ordered in an upward direction (perhaps out of habit).

The absence of the effect indicated in the first section can be explained by taking into account the cultural differences between the country where such effects were detected and the location where this study was carried out.

All studies have limitations, and the main one here is related to the generalisation of the findings, as it was located in a single autonomous region in Spain. It is a common limitation of "survey experiments" that use equivalent samples, many of which are conducted on captive samples such as clients, university students, etc. While several experts have shown that these samples can be generalised,⁴ the findings presented here require further research on the subject. Another factor that can help explain these results is the higher level of training of the personnel who carried out the fieldwork, the exhaustive monitoring and the persistence to ensure that the questionnaire was read exactly as it was written, something that was also verified but does not always take place. This area certainly requires further research.

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⁴ See, for example, Dillman *et al.* studies (2005), among others, conducted with students at the University of Washington, whose findings have been generalisable to national samples.

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